



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/005,006	01/09/1998	SHUICHI KANNO	ASA-695	1954

7590 04/09/2003

CROWELL & MORING LLP
P.O. Box 14300
Washington, DC 20044-4300

EXAMINER

NGUYEN, NGOC YEN M

ART UNIT	PAPER NUMBER
----------	--------------

1754

DATE MAILED: 04/09/2003

37

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/005,006

Applicant(s)

KANNO ET AL.

Examiner

Ngoc-Yen M. Nguyen

Art Unit

1754

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 January 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 40-51 and 75-79 is/are pending in the application.
- 4a) Of the above claim(s) 75-78 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 40-51, 79 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

In this office action, the species of C-F as the compound in the gas stream and aluminum oxide-nickel oxide catalyst are being examined. These species were elected without traverse in Paper No. 6 (filed July 26, 1999). Since there is no clear request from Applicants to shift to other species when filing the request for continued prosecution application, only the originally elected species are treated on the merit in this office action.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 44 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Applicants are requested to point out support in the instant specification, by page and line numbers, for "the catalyst further comprises 7.2 to 61.3% by weight of zinc oxide", wherein the catalyst comprises alumina and 7.2 to 49.4 wt.% of nickel oxide.

It is noted that on page 45 of the specification, a catalyst with alumina:nickel oxide:zinc oxide ratio of 60.7:7.22:17.1 is disclosed, but not the claimed range.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

Art Unit: 1754

the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 40-43, 45-49, 51, 79 are rejected under 35 U.S.C. 103(a) as obvious over Rossin et al (6,069,291), optionally in view of Okazake et al (5,151,263) and Imamura (5,649,985).

Rossin '291 discloses a process for the decomposition of perfluoroalkanes to HF and CO₂ (note claim 1). The process comprises contacting the perfluoroalkanes with aluminum oxide. The perfluoroalkane is contacted with aluminum oxide at a temperature ranging from about 400°C to about 1000°C, or preferably from about 550°C to 800°C (note column 2, lines 55-65). This range is well within the claimed range. The decomposition temperature of C₂F₆ is 750°C (note Example 1. This value is well within the claimed range.

Rossin '291 discloses that perfluoroalkanes are CF₄, C₂F₆, etc. (Note column 1, lines 25-28).

The aluminum oxide is stabilized, for example, with an element selected from the group consisting of barium, calcium, nickel among others (note sentence bridging columns 2-3). The catalyst is formed by slurring pseudoboehmite aluminum oxide (which is encompassed by the claimed "boehmite") in an aqueous or non-aqueous liquid. Once mixed, one or more additional components may be added to the slurry. These additional components may be added as solid metal salts, such as nitrates, acetates, oxalates, chlorides, halides, etc., or may be added as small metal or metal oxide particles. Once mixed, the slurry may be aged, if desired, or used directly in the manufacture of beads, particles, spheres, etc., or used to coat an inert ceramic substrate, such as a monolith. Following manufacture or coating of the inert ceramic substrate, the resulting material must be calcined at a temperature between 350 and

Art Unit: 1754

900°C (note column 4, lines 36-55). The calcination would convert the additional components into oxide forms if they are not already were.

Rossin '291 further discloses that the process is also applicable to the injection of gaseous or liquid phase perfluoroalkanes into a gas stream, including an oxidizing agent, such as air for example, and water (which would become steam at reaction temperature) (note column 5, lines 28-37 and column 3, lines 8-11).

In Rossin '291, since Ni is specifically disclosed as one of the additional components that can be added to the aluminum oxide catalyst, thus, the disclosure of Rossin is considered as having "sufficient specificity" to include alumina-nickel oxide catalyst.

In any event, it would have been obvious to one skilled in the art to select any combination among the specifically disclosed compounds, i.e. nickel-aluminum oxide, *Merck & Co. Inc. v. Biocraft Laboratory Inc.* 10 USPQ 1846.

Rossin further discloses that if the concentration of hydrofluoric acid in the effluent stream is deemed unacceptable, conventional collection or abatement process, such as caustic scrubbing, may be employed to avoid venting acid gases directly into the atmosphere (note column 5, lines 44-48). The processes steps as required in the instant claims for removing HF from the exhaust gases are conventional and well known steps in the art.

For claim 79, Rossin discloses that perfluoroalkanes are released to the environment during certain industrial processes, such as during semiconductor manufacturing processes (note column 1, lines 21-30). Thus, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to treat any perfluoroalkanes which were released from any semiconductor manufacturing

process, including when such perfluoroalkanes were used as etchants or cleaners for semiconductor processes.

Optionally, Imamura '985 is applied to teach that HF is a water soluble component (note column 6, lines 48-49) and it can easily be removed by scrubbing with water (note claim 1).

Optionally, Okazaki '263 can also be applied to teach that acid compounds such as HCl, HF can be absorbed and neutralized by alkali (note column 4, lines 31-34).

Rossin discloses that the catalyst composition comprises aluminum oxide with the addition of between 0.01 and 50% of one or more elements selected from the group consisting of nickel among others (note paragraph bridging columns 3-4). Rossin does not specifically disclose the atomic ratio.

However, it would have been obvious to one of ordinary skill in the art to optimize the atomic ratio of aluminum to nickel based on the disclosed range stated above to obtain a catalyst best suited for transforming perfluoroalkanes.

Claims 44, 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rossin '291 as applied to claims 40-43, 45-49, 51, 79 above, and further in view of Rosenbaum (5,460,792).

The difference not yet discussed is Rossin '792 does not disclose the addition of zinc oxide.

Rosenbaum '792 discloses a process for the destruction of hydrocarbon compounds, which uses a catalyst comprising a carbonaceous pyrolyzed resinous polymer. The catalyst is doped with a compound selected from the group consisting of metal oxides, metal oxyhalides or precursor metal salts wherein the metal of the metal

oxides, metal oxyhalides and precursor metal salts is selected from the group consisting of Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Co, Zn, Pd, Nb, Zr, Mo and mixtures thereof (note claim 1). Rosenbaum '792 further discloses that the process can be used for the destruction of organic compounds, which refer to either halogenated organic, or hydrocarbon compounds or mixture thereof (note column 4, lines 15-18). Exemplified compounds, which can be destroyed, are C_2Cl_4 , CCl_4 (note column 6, lines 6 and 9), Rosenbaum '792 teaches that the halide can be any halide, while chlorine and bromine are being preferred (note column 7, lines 28-26).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to further include zinc in the catalyst of Rossin '792 because Rosenbaum '792 suggests that zinc, just as nickel, would promote the destruction of the halogenated hydrocarbon.

Applicant's arguments and declaration filed January 24, 2003 have been fully considered but they are not persuasive.

Applicants argue that in the instant specification, when NiO and ZnO are added, desirable results are obtained when a total of Ni and Zn is 50-1 atomic percent (p. 10, lines 1-9) and Because the amount of NiO is limited to 5-40 atomic percent, i.e., 7.2 to 49.4% by weight (p. 11, line 14), when both NiO and ZnO are added, the resulting composition becomes 7.2% by weight or more and 61.3% by weight or less (corresponding to 5 Ni atomic percent and Zn 45 atomic percent).

Granted that it is disclosed in Applicants' specification that when more than one metal oxide are used, the ratio of aluminum in alumina to the metallic element of the at least one of the other components by atom is 50-99:50-1 (note paragraph bridging pages 9-10), however, the atomic ratio of aluminum to nickel of 95 to 60 : 5 to 40 as

Art Unit: 1754

mentioned in Applicants' argument is for an embodiment in which the catalyst contains alumina and only nickel oxide (note page 11, lines 7-15). It should be noted that the embodiment in which a catalyst comprising a mixture of alumina, nickel oxide and zinc oxide is mentioned in the following paragraph (note page 11, lines 16-22), however, there is no mention of the ratio of alumina to the metallic elements. Since the ratios as mentioned in Applicants' argument are for two different embodiments (one has both nickel and zinc, the other has only nickel), they cannot be based upon to calculate the range for the weight percent of the zinc oxide in the catalyst.

Applicants argue that Rossin does not disclose, teach or suggest, a catalyst comprising aluminum oxide and 7.2 to 49.4 wt% nickel oxide.

Rossin fairly discloses that the catalyst, which comprises aluminum oxide, can further contains between 0.1 to 50 wt% by weight of other components such as nickel among others. This range overlaps the claimed range.

Applicants argue that Rossin does not teach or suggest using such a catalyst to decompose (1) a compound containing carbon and fluorine; (2) a compound containing carbon, hydrogen and fluorine; (3) a compound containing carbon, hydrogen, oxygen, and fluorine; (4) SF_6 ; and (5) NF_3 .

It should be noted that since there is no request to shift the elected species, only C-F compound is treated in this office action.

Applicants argue that as discussed in the personal interview and as shown in the Declaration (filed 2/7/2002), the claimed alumina-nickel oxide catalyst exhibits surprising and unexpected results by showing a high level of catalytic activity over an extended period of time.

The showing in the Declaration is not persuasive, because Rossin discloses that "the conversion of C_2F_6 increased from 88 to 98% during the first 25 hours of the run,

Art Unit: 1754

then remained constant at 98% throughout the duration of the 400 hour run" (note column 12, lines 60-63), but there is no indication that the after the 400 hour run, the conversion would drop.

For item 8 in the declaration, it should be noted that Applicants' claims do not require any concentration for the C-F compound in the gas stream, thus the showing is not commensurate in scope with the claims.

Applicants argue that as indicated by the Examiner, when fired in the air, metal oxide is formed, yet there is description that firing in an inert atmosphere is impossible and there is no working example that uses both Ni and Al.

As long as in Rossin, it is possible for nickel oxide to form, it is not necessary to show that nickel oxide can be formed under all conditions. Also, the teaching of Rossin should not be limited to just the examples.

Applicants present portions of the file history of the Rossin patent as evidence that Rossin does not provide a sufficient teaching or suggestion of the claimed invention. Applicants urge that the Examiner found that claims 4 and 17, which recited the aluminum oxide/nickel combination, "[were] not supported by a commensurate enabling disclosure" and "[were] misleading".

In the office action for Rossin patent, under 35 USC 112, first and second paragraph, item (B), the claims are rejected for "not supporting by a commensurate enabling disclosure", this is regarding only to the activity below about 500°C, not the nickel oxide-alumina combination; for item (C), the claims were misleading because the metals appear to be catalytic component, not stabilizing agent, however, the claimed were not misleading because of the nickel-alumina combination. Whether the nickel is added to the catalyst as a stabilizing agent or catalytic component, such addition is still

fairly suggested by Rossin. There is nothing in the prosecution of Rossin to show that the addition of nickel to the aluminum oxide catalyst is in error or misleading.

The rejection over Rossin in view of Rosenbaum is maintained for the same reasons as stated above.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Ngoc-Yen Nguyen whose telephone number is (703) 308-2536. The examiner is currently on a part time schedule.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Stanley Silverman, can be reached on (703) 308-3837. The fax phone number for this Group is (703) 872-9311 (for OFFICIAL After Final amendment only) or

Art Unit: 1754

(703) 872-9310 (for all other OFFICIAL faxes). UNOFFICIAL fax can be sent to (703) 305-6078.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.

N. M. Nguyen
4/6/03


N. M. Nguyen
Primary Examiner
Art Unit 1754